

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Amendment of Part 90 of the Commission's Rules)	WP Docket No. 07-100
)	
Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band)	PS Docket No. 06-229
)	
Service Rules for the 698-746, 747-762 and 777- 792 MHz Bands)	WT Docket No. 06-150
)	
To: The Commission		

**COMMENTS OF
CARLSON WIRELESS TECHNOLOGIES, INC.**

Carlson Wireless Technologies, Inc. ("Carlson"), pursuant to Sections 1.415 and 1.419 of the Commission's Rules, submits these Comments in the above-captioned proceeding.¹ Carlson urges the Commission to promote improvements in spectrum efficiency in the 4.9 GHz band by adopting rules to enable secondary commercial use of the band on a shared basis. If the Commission expands the 4.9 GHz eligibility rules to facilitate such uses and adopts a geolocation database to mitigate the potential for harmful interference, Carlson believes that significant benefits would flow to public safety users, commercial wireless broadband providers and end users.

¹ *Amendment of Part 90 of the Commission's Rules; Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band; Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, Fourth Report and Order and Fifth Further Notice of Proposed Rulemaking, WP Docket No. 07-100, PS Docket No. 06-229 and WT Docket No. 06-150, FCC 12-61, rel. June 13, 2012 ("FNPRM"). By Order released September 26, 2012, the Commission established November 1, 2012 as the extended deadline for filing Comments in this proceeding. See *Order*, Docket Nos. 07-100, *et al.*, DA 12-1540, rel. Sept. 3, 2012.

Introduction

Carlson is an equipment design and manufacturing company formed in 1999 to develop a variety of fixed wireless and other radio products to address communications needs. Among other products, Carlson develops and sells the LongHaul™ series of 4.9 GHz equipment to public-safety entities. Carlson estimates that it has sold more than 200 units per year in the three years since it began marketing the LongHaul™ equipment line. With this equipment, public safety users can implement backhaul and microwave systems for use with two-way radio, mountaintop repeaters and other network components facilitate service. Given its existing marketplace presence, its record of innovation and the potential for increased use of the 4.9 GHz band, Carlson has a significant interest in any new rules that the Commission adopts in this proceeding.

As technology has evolved and broadband services have become more widespread and data-intensive, Carlson has pioneered the use of TV white spaces (“TVWS”) for fixed wireless broadband services, particularly for last-mile locations in rural and remote areas. Carlson has successfully deployed experimental TVWS operations nationwide and overseas. The company is working closely with Spectrum Bridge and Telcordia, the two Commission-approved TVWS database administrators, to bring products to market that improve interference avoidance by accurately determining signal levels for protected TV contours. Carlson expects to submit its equipment for Commission certification this month.

The lessons of TVWS – and in particular the development of geolocation capabilities to protect incumbents and identify available spectrum – can prove instructive as the Commission seeks to make more intensive and affordable use of the 4.9 GHz band

for broadband. For these reasons, as described below, Carlson urges the Commission to allow commercial operators to make use of the 4.9 GHz band on an unlicensed basis and using a geolocation approach to reduce harmful interference.

I. THE COMMISSION SHOULD ALLOW UNLICENSED COMMERCIAL USE OF THE 4.9 GHz BAND ON A SECONDARY BASIS.

The Commission seeks comment on “whether the Commission should expand eligibility to use the [4.9 GHz] band to non-public safety users, subject to protections to maintain the integrity of public safety operations.”² Carlson urges the Commission to expand eligibility to permit unlicensed commercial users to share the 4.9 GHz band on a secondary basis with public safety users, provided that users comply with the database registration procedures described below. By facilitating unlicensed use, such rule changes would remove a critical barrier to entry. The resulting benefits would include more intensive use of the band and increased broadband deployment, particularly in areas with heavily congested spectrum. In many areas of the country where broadband service is unavailable or lacking, opening the 4.9 GHz band to new broadband service would allow for the benefits of increased spectral use.

Given the importance of public safety uses of the band, permitting 4.9 GHz band operations on a secondary basis would afford priority and interference protection to valuable public safety applications.

II. THE COMMISSION SHOULD ADOPT A GEOLOCATION DATABASE TO ENSURE THAT SECONDARY 4.9 GHz BAND USERS DO NOT CAUSE HARMFUL INTERFERENCE TO PUBLIC SAFETY USERS.

The Commission proposes “to require all current 4.9 GHz licensees to register the technical parameters of their permanent fixed point-to-point, point-to-multipoint and

² *FNPRM* at ¶43.

base-to-mobile stations, including permanent fixed receivers when applicable” into a database.³ Carlson supports adoption of a geolocation database approach to ensure that secondary commercial users do not cause harmful interference to public safety licensees in the 4.9 GHz band, as set forth below. A geolocation database system has been adopted effectively in the TVWS and would have many advantages in the 4.9 GHz band.

Carlson welcomes the Commission’s invitation to provide information on the costs and benefits of a database and registration system to coordinate 4.9 GHz use. As used in TVWS, the database paradigm could be extended to public safety use in the 4.9 GHz band and could “enable a dynamic, almost real-time environment where different entities or different transmitters or links could be used at different times based on prior knowledge of activity in the band.”⁴ Carlson has been at the forefront of TVWS development, and has invested significant time and money to research, design and manufacture base stations and consumer premise equipment that will enable its equipment to reliably communicate with a geolocation database to ensure that unlicensed systems do not interfere with primary and secondary facilities entitled to interference protection. Carlson believes that changes to its existing equipment to provide for database controls can be quickly implemented for approximately \$120 per base station and expects that database communication capability can be integrated into its existing 4.9 GHz equipment in a few weeks.

In addition to protecting primary public safety users from commercial operations, a database also can be used to coordinate among primary users to help speed deployment of broadband equipment and services. Traditional coordination processes can be complex,

³ *Id.* at ¶28.

⁴ *Id.* at ¶33.

time-consuming and costly compared to database approaches. Part 101 coordination involves several steps before networks can be deployed: identifying existing licensees, permittees and applicants in the area that might be affected; selecting sites to avoid harmful interference; making oral or written notifications to licensees, permittees and applicants and including relevant technical details of the proposal;⁵ preparing written documentation of responses; making reasonable efforts to identify and eliminate all problems and conflicts and conducting such efforts within a 30-day notification period absent an expedited prior coordination period. By contrast, a geolocation database can facilitate much faster coordination than traditional Part 101 processes due to the dynamic nature of database access and rapid assessment of the local interference environment.

Second, a database system should result in more intensive spectrum usage than traditional coordination approaches. In light of the flexible nature of the 4.9 GHz band and the many types of networks and devices to be accommodated, there is risk that existing approaches would be applied too conservatively and leave spectrum fallow. As the *FNPRM* observes, several parties “emphasize that Part 101 links are highly directional and thus can be represented as narrow paths on a coordination map in contrast, they note, the low-power, less-directional, geographically-disbursed links in a 4.9 GHz network must be represented as a service area or sector.” Carlson agrees that a database

⁵ Pursuant to Section 101.103(d)(ii), these details include, at a minimum: applicant's name and address; transmitting station name; transmitting station coordinates, frequencies and polarizations to be added, changed or deleted; transmitting equipment type, its stability, actual output power, emission designator, and type of modulation (loading); transmitting antenna type(s), model, gain and, if required, a radiation pattern provided or certified by the manufacturer; transmitting antenna center line height(s) above ground level and ground elevation above mean sea level; receiving station name; receiving station coordinates; receiving antenna type(s), model, gain, and, if required, a radiation pattern provided or certified by the manufacturer; receiving antenna center line height(s) above ground level and ground elevation above mean sea level; path azimuth and distance; estimated transmitter transmission line loss expressed in dB; estimated receiver transmission line loss expressed in dB; and for a system utilizing ATPC, maximum transmit power, coordinated transmit power, and nominal transmit power.

approach would result in more intensive use of the band by accounting for the variety of networks and devices to be deployed.

Third, the geolocation approach would facilitate better, more accurate interference management. The geolocation database offers dynamic, near-real-time responses to the local interference environment. This interference can change rapidly based on local conditions and the use of specific transmitters and links at any given time. Other parties in this proceeding have noted the complexity of 4.9 GHz systems and the difficulties in coordinating uses in the band using traditional methods.⁶ Carlson believes that the database approach would facilitate more intensive and effective use of the band in light of the more granular interference management it affords.

Finally, the rule changes requested herein would reduce equipment costs and would make more affordable equipment available in the market place. Carlson projects that its existing LongHaul™ 4.9 GHz public safety equipment series could be expeditiously modified to incorporate TVWS geolocation capabilities at little cost. Carlson estimates that the incremental cost to adjust software settings and add geolocation capability to its LongHaul™ equipment would be about \$120 more per base station, and that these modifications could be quickly and effectively implemented to accommodate database coordination. What would follow would be reduction in prices and improvements in the quality and speed of interference mitigation.

III. THE COMMISSION SHOULD ADOPT SPECIFIC TECHNICAL PARAMETERS FOR DATABASE REGISTRATION.

Accurate, reliable and comprehensive database information is critical to the success of the band. In the *FNPRM*, the Commission seeks “input on a comprehensive

⁶ *Id.* at ¶¶ 23-24.

list of technical parameters that the database should store for each type of operation to facilitate successful coordination.”⁷ Here, the TVWS approach is instructive. The TV bands database compiles the following information from incumbent TV stations: transmitter coordinates (latitude and longitude in NAD 83), effective radiated power (ERP), height above average terrain of the transmitting antenna (HAAT), horizontal transmit antenna pattern (if the antenna is directional), amount of electrical and mechanical beam tilt (degrees depression below horizontal) and orientation of mechanical beam tilt (degrees azimuth from true north); channel number and station call sign. At a minimum, such information should be compiled in the 4.9 GHz band database.

Conclusion

For the foregoing reasons, Carlson respectfully requests that the Commission adopt the proposals set forth in these Comments.

Respectfully submitted,

**CARLSON WIRELESS TECHNOLOGIES,
INC.**

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⁷ *Id.* at ¶28.